

Virtual Printing with VMware Horizon View 5

Technical Information

Cortado AG
Alt-Moabit 91 a/b
10559 Berlin
Germany/Alemania

Cortado, Inc.
7600 Grandview Avenue
Suite 200
Denver, Colorado 80002
USA/EEUU

Cortado Pty. Ltd.
Level 20, The Zenith Centre,
Tower A
821 Pacific Highway
Chatswood, NSW 2067
Australia



E-mail: info@team.cortado.com
Web: www.thinprint.com
Issued: December 10, 2013 (v20)

© Copyright

This document is the intellectual property of Cortado AG. This document may be copied in whole or in part, provided this Copyright notice is included in every copy.

® Registered trade marks

All hardware and software names mentioned in this document are the registered trademarks of their respective companies or should be regarded as such.

Safety warning

All Cortado products are pure software solutions. Please note the safety warnings in the technical documentation from your hardware vendor and from the manufacturer of each device and component. Before beginning installation, we recommend closing all windows and applications and deactivating any virus scanner.

Overview and scenarios	4
Why virtual printing?	4
Printing solutions integrated into Horizon View	5
Alternative 1: Virtual Printing	5
Printer and driver centralization with ThinPrint	8
Alternative 2: Server Engine and Management Center	9
Further interesting features	12
Print job tracking	12
Connection Service	13
Notes on installation and testing functionality	14
Installation of VMware Tools and View Agent	14
Testing functionality	15
AutoConnect	15
Port monitor and Output Gateway	17
Virtual Channel Gateway	19
ThinPrint Client (Windows)	20
Appendix	20
Version info for VMware Tools and View Agent components	20
Further sources	21
FAQs	22

Overview and scenarios

Why virtual printing?

To print, one requires so-called 'drivers'. These ensure the layout of data to be printed from applications is accurately translated into the formats recognized by the respective printers.

Printer drivers are generally pre-programmed by the manufacturers. Due to the number of printer models, manufacturers try to cover as many of them as possible with a series or universal driver. They achieve this with varying degrees of success. Therefore the IT administrators need to test every newly acquired printer to find which driver delivers the best results with the applications used in the business.

Then the new drivers must be distributed throughout the firm – onto workstations, print servers or View desktops – anywhere that print output is generated or rendered. The cost of this increases significantly with the size of the IT environment. There are primarily two established strategies to meet the goal of reducing these costs:

- Virtualizing the printer drivers
- Centralizing the printer drivers

With **Virtualization**, wherever an application is running, only a virtual printer driver is used. The print output generated there is then sent to where a (native) printer driver is installed and where it is finally rendered. To do this though, it may be necessary to distribute the printer drivers on to many workstations. With **Centralization** however, distributing the printer drivers is no longer necessary. The printer drivers need only be installed on one, or on just a few, print servers.

The firms VMware and Cortado have together developed a concept whereby you use both strategies, and can combine one with the other. The VMware module for virtualizing printer drivers is called VIRTUAL PRINTING. It is a component of both of View Agent and of VMware Tools (on ESX Servers: up to version 9.0.5). It also provides an interface for optional expansion with other ThinPrint solutions for centralizing and managing drivers and printers.

This printer management is scalable, from small environments with only a few View desktops to a very large environment with, for example, 10,000 printers and print servers in the data center and in remote branch offices. In the following, you will be introduced to ThinPrint components integrated into Horizon View, as well as expansion options using various products and components from the ThinPrint family.

The View Agent option VIRTUAL PRINTING consists not only of the actual virtual printer driver, but also includes the following components:

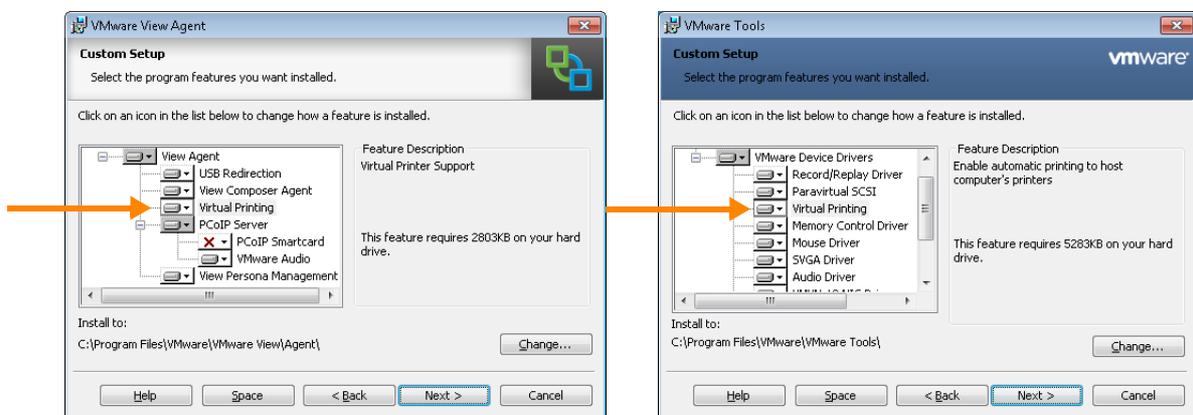
- **TP Output Gateway** and **TP Output Gateway PS** (virtual and universal printer drivers for Windows and Mac/Linux)
- **ThinPrint Print Monitor** (for compressing and sending print data)
- **AutoConnect** (for printer mapping on View desktops)
- **Virtual Channel Gateway** (for routing print output from a central print server via PCoIP or RDP to the client/host computer)

In addition, the following ThinPrint components can be found in Horizon View:

- **Location-Based Printing**
- **ThinPrint Client** (integrated into View Clients for Windows, as well as those for Apple Mac OS and for Ubuntu)

Printing solutions integrated into Horizon View

The ThinPrint components integrated on the server-side in VMware are grouped under the name VIRTUAL PRINTING. They are a part of View Agent (see left in Illus. 1). Up to version 9.0.5, they also were a part of VMware Tools from ESX Server (right in Illus. 1). Care should be taken to have as minimum View Agent version 5.1.2.

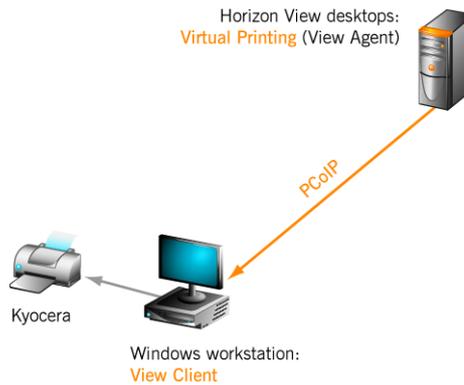


Illus. 1 VIRTUAL PRINTING as a component of View Agent (left) and – up to version 9.0.5 – also of VMware Tools (right)

Alternative 1: Virtual Printing

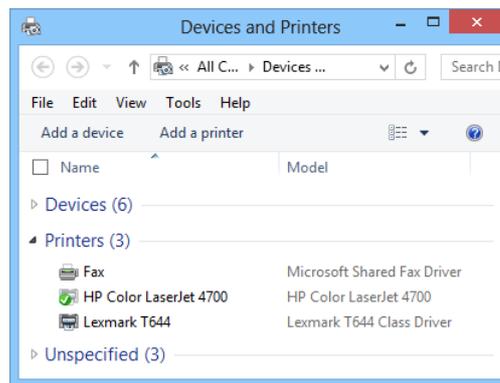
Windows applications generally deliver their print output to the operating system in the EMF format. **Output Gateway** takes advantage of this. It is integrated within the operating system as a printer driver, but it doesn't render any print output. Instead, it sends the EMF files from the applications as virtual print output (via PCoIP or RDP) to a Windows workstation, where the print output is fully rendered using a native printer driver, and then sent on to the printer (see Illus. 2). In ThinPrint products this process is called **Driver Free Printing** – which refers to the substitution of the native printer drivers by **Output Gateway** in View desktops.

However, for non-Windows workstations a universal PostScript driver (TP Output Gateway PS) and a PCL driver (depending on the Windows version) are provided instead.

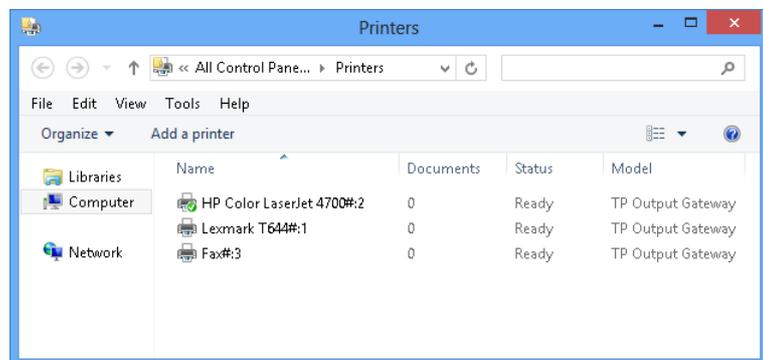


Illus. 2 virtual printing (with print data compression) directly to a workplace printer (the arrow shows the printing pathway)

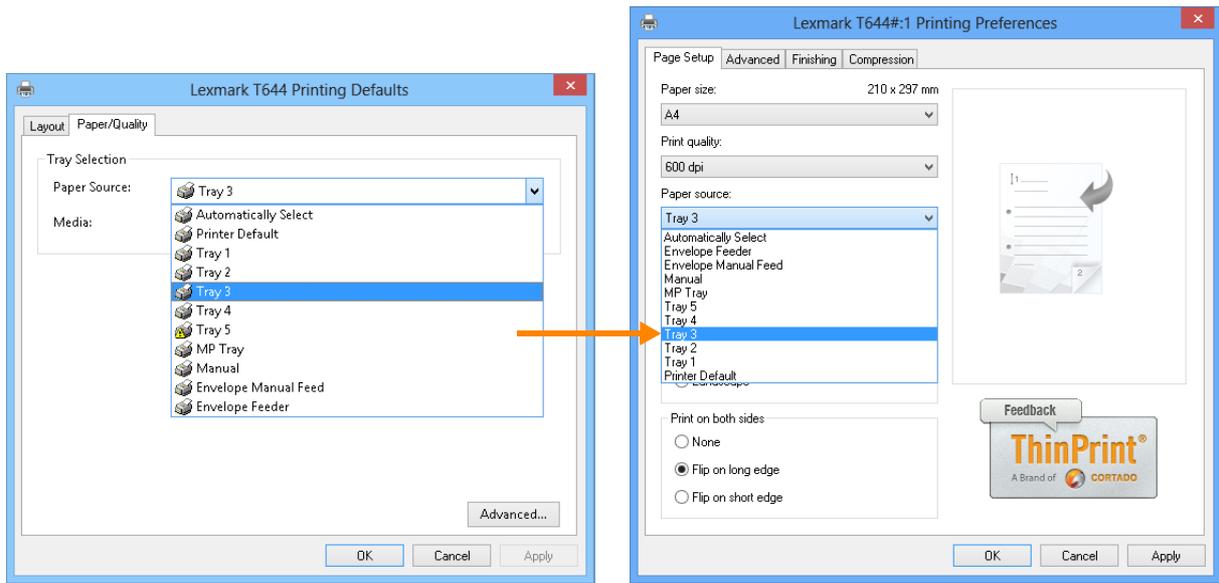
Printers installed on Windows workstations (Illus. 3) are linked to View desktops by AutoConnect (Illus. 4). AutoConnect uses Output Gateway as a (virtual) driver. It also loads the properties of the native driver from the workstation onto the View desktop. These are then displayed in the user interface of Output Gateway (Illus. 5). A positive additional benefit of **Driver Free Printing** is a uniform, user-friendly interface for all printers.



Illus. 3 printers with native print drivers installed on a workstation



Illus. 4 printers with Output Gateway as virtual driver, created on a View desktop by AutoConnect

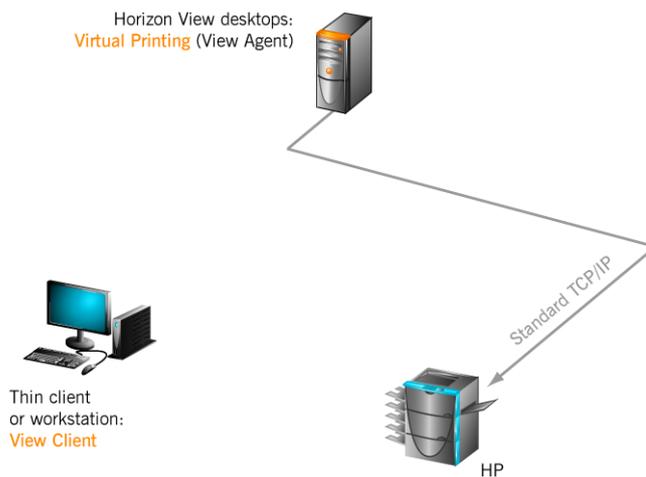


Illus. 5 paper sources of the native driver on the workstation (left) are displayed in the Output Gateway interface on the View desktop (right)

Location-Based Printing

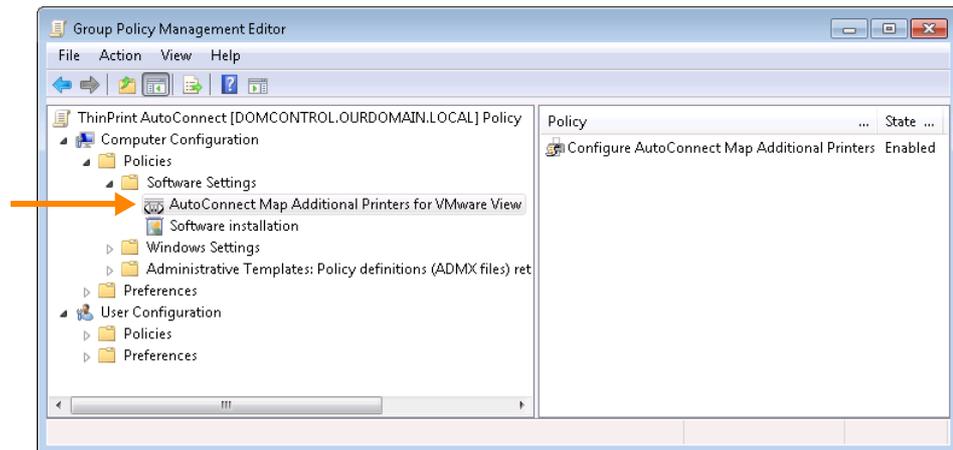
In addition to workstation printers (Illus. 3) AutoConnect can also create network printers, to which the print jobs are sent directly with the protocol Standard TCP/IP (Illus. 6). The management of these printers is carried out as group policy (GPO) in Active Directory (Illus. 7).

That procedure is called **Location-Based Printing**. Neither print data compression nor Driver Free Printing is used for this. All the printer drivers are pre-installed on the templates of the View desktops.



Illus. 6 conventional (location-based) printing with native driver, directly to a network printer (the arrow shows the path of the print data)

- To set up Location-Based Printing (Illus. 7) use the information guide *ThinPrint GPO Configuration for Location-Based Printing* at www.vmware.com.



Illus. 7 group policies for automatically creating network printers

- Benefits*
- Driver Free Printing for Windows workstations and for thin clients with Windows Embedded
 - high compression of print data
 - automatic creation of workstation and network printers on the View desktop using AutoConnect
 - configuration of network printers with group policies (Location-Based Printing)

- Restrictions*
- Driver Free Printing is not possible for non-Windows devices or with Location-Based Printing. The respective printer drivers must be manually installed on the templates of the View desktops
 - no print data compression with Location-Base Printing
 - thin client support only for Windows Embedded
 - to also use Driver Free Printing on network printers, these must be manually installed onto every Windows workstation

- Recommendations*
- suitable for small View environments without print servers, preferably with Windows workstations
 - View Agent from version 5.3 – minimum v5.1.2
 - VMware Tools from version 9.4.0 – minimum v8.6.5
 - client-side support for Windows and Mac OS workstations and for workstations with Ubuntu 12.04

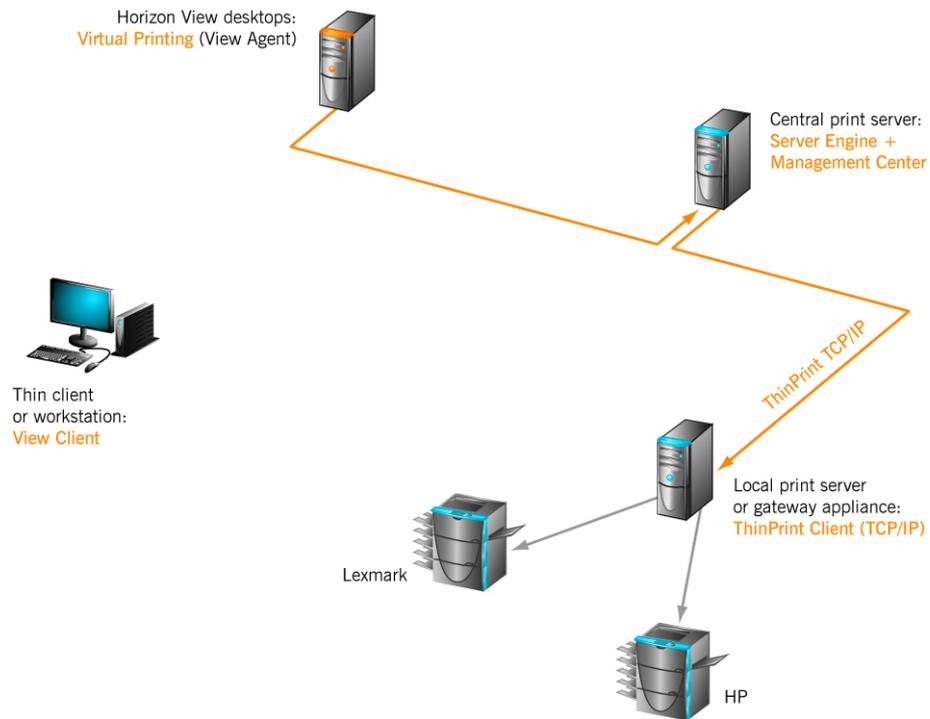
Printer and driver centralization with ThinPrint

As outlined above, **Driver Free Printing** for ThinPrint components integrated in Horizon View is only possible in conjunction with Windows workstations, because the print output must be rendered on a Windows computer. If not, the rendering can also be carried out on a Windows print server.

With ThinPrint you can choose to move rendering to either a central print server in the data center or to local print servers in outside locations (see Alternative 2). That way, Driver Free Printing is made possible for all types of printers, regardless of the terminal used.

Alternative 2: Server Engine and Management Center

Full ThinPrint functionality is provided with a combination of Server Engine and Management Center. Through this, the printing environment can be scaled from just a few devices using a central print server, to environments with several hundred thousand terminals and printers, as well as a large number of print servers in the data center and branch offices (Illus. 8). Instead of local print servers, maintenance-free Gateway appliances (from the firm SEH) can also be used ([Page 21](#)).

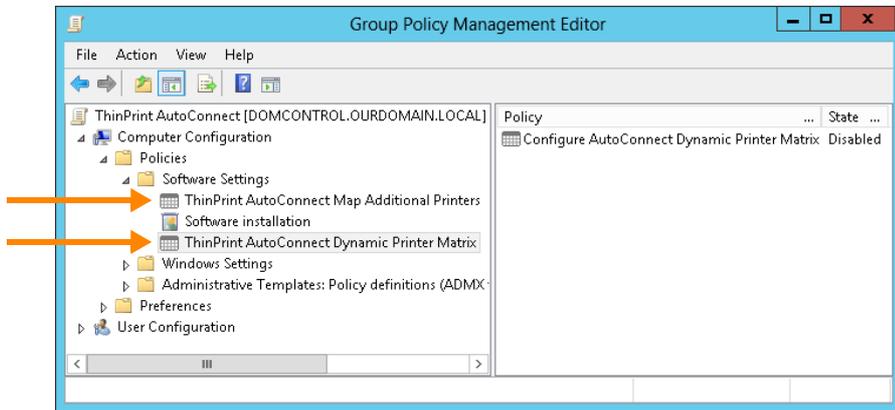


Illus. 8 virtual printing via print server, directly to network printers (arrows show the path of the print data)

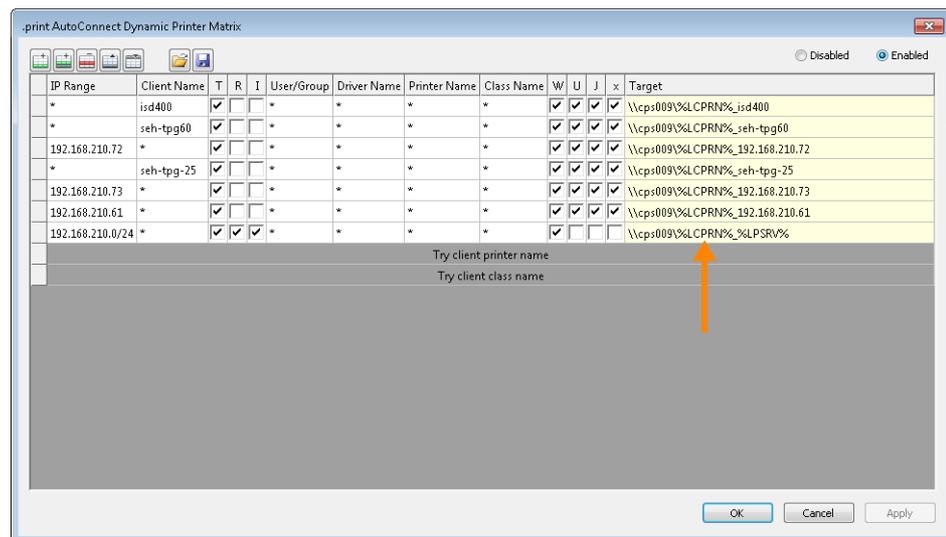
In addition to the functions described in alternative 1, ThinPrint Server Engine offers the following added benefits:

- Print data can be transmitted to ThinPrint Clients bandwidth-limited, compressed and encrypted; these can be installed on workstations, thin clients or local print servers or be integrated in network printers or Gateway appliances ([Page 21](#)).
- Print job rendering is possible on either a central or on local print servers
- Mixed environments are supported for Driver Free Printing: The applications can run on any desktop – under Horizon View, Microsoft Remote Desktop Services or on Windows workstations
- simultaneous output on multiple printers is possible (VirtualCopy)
- generate print jobs for mobile devices (Print-to-Cloud and Print-to-ePaper)
- support for diverse protocols: TCP/IP, PCoIP, RDP and ICA
- support for Microsoft failover clusters and Windows core servers

- two AutoConnect mapping tables can be used:
 - Map Additional Printers: maps any individual printer share specified there
 - Dynamic Printer Matrix: maps using information from ThinPrint Clients (table can be exported from Management Center and imported into the group policy); it can be greatly reduced with wildcards and especially with variables (see *Dynamic Printer Matrix* in Illus. 9 and TARGET COLUMN in Illus. 10)



Illus. 9 group policies for automatic creation of printers



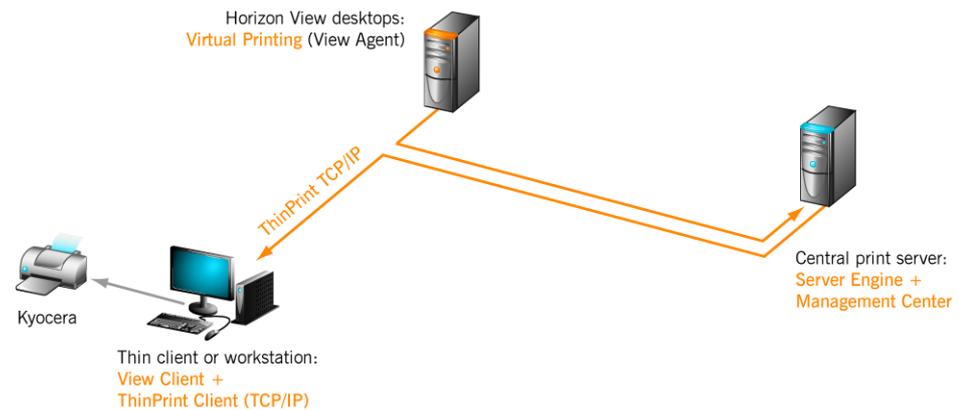
Illus. 10 Dynamic Printer Matrix: Printer names need only be specified using variables, because AutoConnect obtains them from ThinPrint Client

Note! If you already used the *Location-Based Printing* GPO before (Illus. 7) and then changed to the *Server Engine* GPOs (Illus. 9) make sure that you don't import the old configuration (.csv file) into the new GPO. Otherwise you could get the message "GPO data does not match with configured scenario. Compatibility mode activated"; in this case disable the GPO in question, then re-enable it and start with a new table.

ThinPrint Clients support a range of protocols. For example, the ThinPrint Client integrated in Horizon View Client supports the protocols PCoIP and RDP. A TCP/IP version of ThinPrint Client is installed, or already integrated on local print servers, Gate-

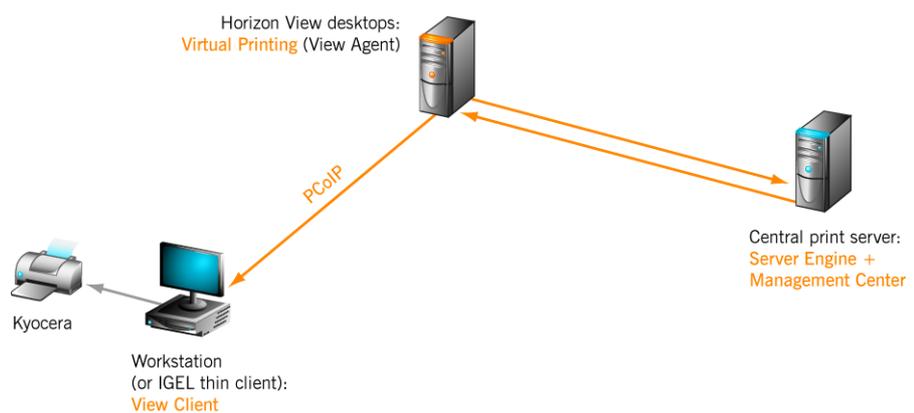
way appliances and network printers. But most thin clients versions of ThinPrint Client support only TCP/IP (ask your supplier about this). If printers are connected locally to terminals, print jobs can also be sent there directly from the central print server.

If ThinPrint Client is not already integrated into View Client, its TCP/IP version is often already installed on thin clients – otherwise it can be separately installed on workstations (Illus. 11). This makes it possible to send print data directly to the terminal via TCP/IP – bypassing the View desktop session.



Illus. 11 virtual printing via print server and TCP/IP directly to a workplace printer (bandwidth-limited, compressed and encrypted if needed; arrows show the path of the print data)

If print jobs from the central print server are also to be sent to mobile or home-users, then to do so – due to firewall settings or Network Address Translation – often only the session protocol is available. In this case Server Engine can send the print data (after compression), also via TCP/IP, back to the View desktop. Virtual Channel Gateway (integrated in View Agent) receives the data there and forwards it via PCoIP or RDP on to the Windows workstation (Illus. 12).



Illus. 12 virtual printing via print server and PCoIP directly to a workplace printer (bandwidth-limited, compressed and encrypted if needed; arrows show the path of the print data)

- Benefits*
- the full functionality of Server Engine and Management Center can be employed for all types of devices: e.g. Driver Free Printing, bandwidth counterconditioning and encryption of print data.
 - the path of print data can be freely selected, depending on the individual requirements. Print protocols: TCP/IP, PCoIP, RDP, ICA
 - extremely convenient printer mapping with AutoConnect tables *Dynamic Printer Matrix* and *Map Additional Printers*
 - convenient, databank-supported management of all printers on the central print server with Management Center
 - MMC supported configuration of ThinPrint ports and V-Layer pairs (without Management Center)
 - Support for mixed environments, in which applications can run additionally on Microsoft Remote Desktop Services, Citrix XenApp or XenDesktop as well as on Windows workstations
 - Support for failover clusters and server core installation
 - Print job statistics (Tracking) available (see below)
- Restrictions*
- additional license costs for ThinPrint Server Engine (per user) and Management Center (per printer)
- Recommendations*
- suitable for medium to large View environments with central and/or local print servers and/or Gateway appliances (from SEH)
 - Server Engine from v8.6.1 and Management Center from v2.1

Further interesting features

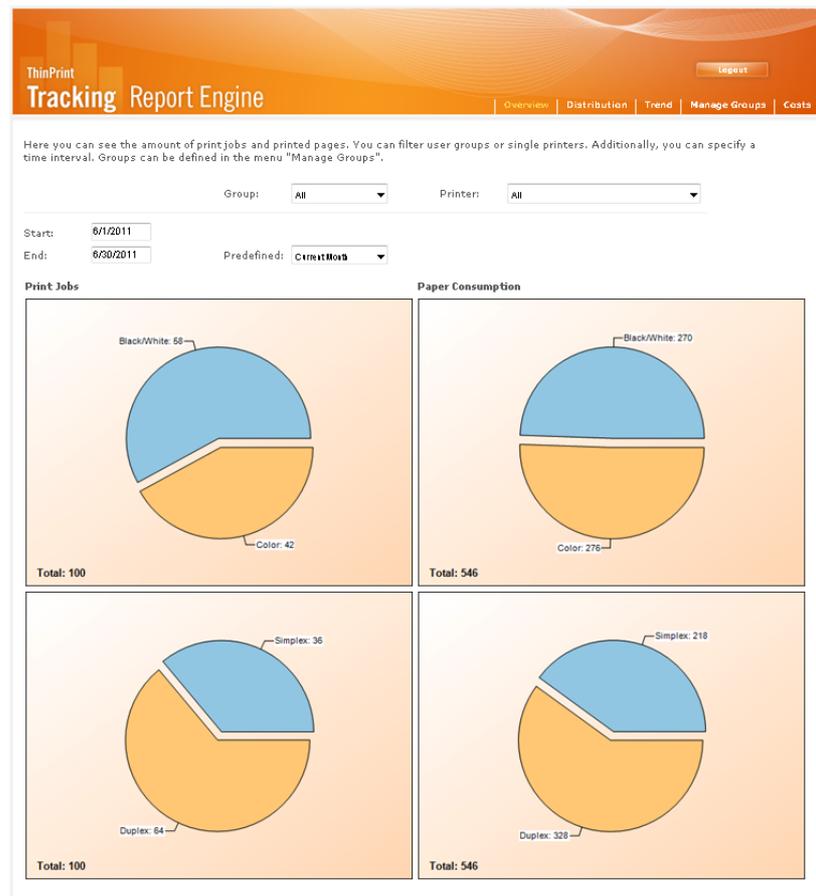
Print job tracking

You can collect statistical data about print jobs sent by Server Engine (Tracking). The printing information, which is included here in an SQL database, includes:

- origin of a print job
- printer used
- settings used
- print data compression
- number of pages printed
- information on whether or not the print job was transmitted without errors

Furthermore, the Tracking Report Engine allows the information contained in the SQL database to be clearly presented in a web browser. According to various criteria, all the essential data from print jobs can be accumulated and sorted, and presented in graphical form (Illus. 13).

All tracking components are included within Server Engine, so no separate license is required.



Illus. 13 summary of SQL data in web browser (example)

Connection Service

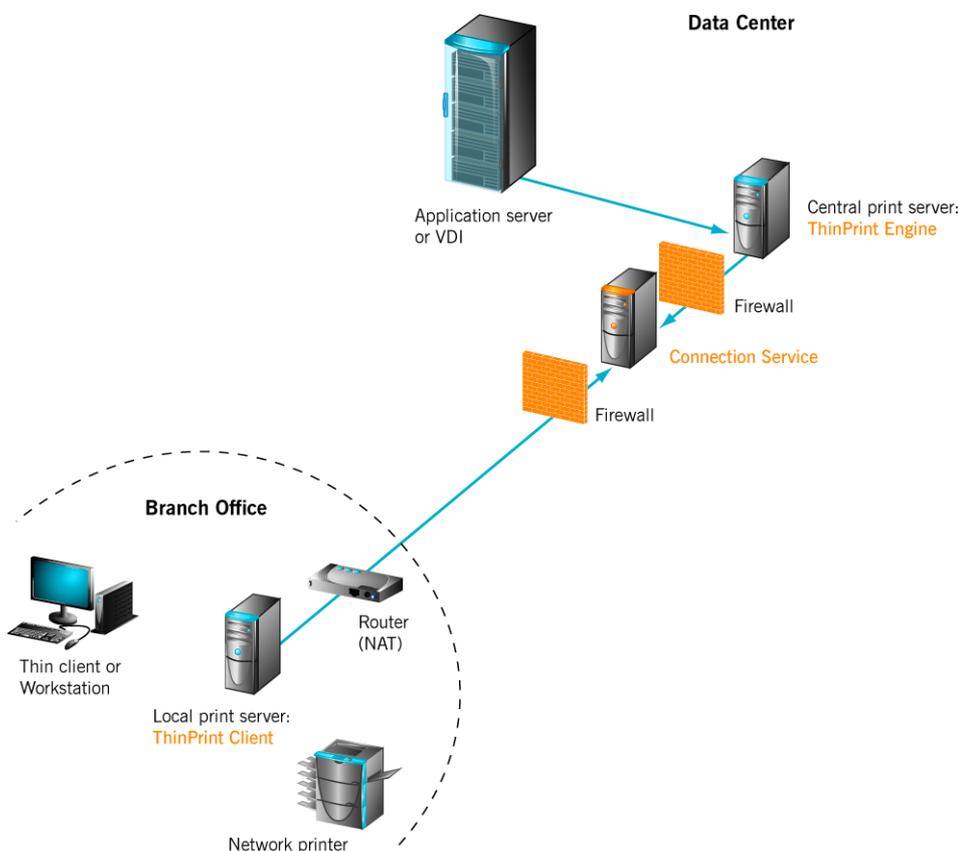
The switch from expensive leased or dedicated lines to low-cost VPN connections – mostly based on the inexpensive DSL standard – is a must these days for every IT manager. But printing over these VPN connections presents the administration with some challenges: termination of entire jobs at the slightest instability in the DSL connection, inability to address printers in masked networks¹ or the need to provide printer drivers centrally, for printers that are located in branch offices, are just a few of the difficulties that administrators must deal with. Moreover, print jobs with very high data volumes can quickly cause the cost of VPN connections with volume-metered tariffs to skyrocket.

Connection Service offers the ideal solution for all these problems. It stabilizes the transmission of print data, even during line interruptions of up to 90 seconds. In contrast to the usual direction of communications, Connection Service enables connections from remote sites to the central server and thus allows the addressing of network printers over TCP/IP, even in masked networks or behind firewalls (Illus. 14). It is ideal for use in the DMZ², as the direction of the TCP connection is always incoming, so no data will be cached on the host computer, i.e. in the DMZ.

¹ networks with Network Address Translation (NAT)

² Demilitarized Zone

Connection Service is a part of the ThinPrint product **Connected Gateway**. It is supported by Server Engine, as well as by Management Center. However it does require additional licensing.



Illus. 14 ThinPrint Engine sends print jobs using Connection Services (arrows indicate the directions of communication)

Notes on installation and testing functionality

Installation of VMware Tools and View Agent

- | | |
|--|---|
| <i>Installation sequence (recommended)</i> | <ol style="list-style-type: none"> 1. VMware Tools installation (minimum version 8.6.5) incl. Virtual Printing option (cf. Illus. 1 auf Page 5). 2. View Agent installation (minimum version 5.1.2) incl. Virtual Printing option |
|--|---|

If VMware Tools from ESX Server (e.g. v8.6.5) is installed after View Agent (e.g. v5.1.2), the VMware Tools installer recognizes that the components to be installed are older than those already installed (see table on [Page 20](#)) and automatically skips their installation. On the other hand, the View Agent 5.1.2 installer updates all ThinPrint components that were previously installed by VMware Tools; it is therefore not necessary to uninstall the Virtual Printing component of VMware Tools beforehand (contained up to version 9.0.5).

Note: if the ThinPrint components of VMware Tools or View Agent have been uninstalled, the printing processor `tpwinprn.dll` is not deleted (because it's blocked by the print spooler); it will however – as expected – be updated on the installation of View Agent.

The PCoIP and RDP types of ThinPrint Client are integrated in View Client for Windows, Mac OS and Ubuntu (from v12.04). For all other platforms, the TCP/IP type of ThinPrint Client can be used; it must either be installed separately or, in certain circumstances, enabled in thin clients.

All ThinPrint components integrated in Horizon View are configuration-free.

ThinPrint components Below you will find an overview of the ThinPrint components integrated in Horizon View (cf. table on [Page 20](#)).

■ View Agent

- ThinPrint port monitor (`TPVMMon.dll`) for sending compressed print jobs via PCoIP or RDP to the ThinPrint Client
- Output Gateway (`tpprn.dll`, `tpprnu.dll`, `tpwinprn.dll`) = virtual printer driver for sending print data in EMF format
- AutoConnect (`TPAutoConnSvc.exe`, `TPAutoConnect.exe`, `TPSvc.dll`) for automatically creating or connecting printers in the View desktop session
- Virtual Channel Gateway (`TPVCGateway.exe`) for routing print jobs that come from a central print server via PCoIP or RDP to the ThinPrint Client (only relevant in conjunction with a Server Engine)

■ View Client

- Refer to the section below.

Testing functionality

AutoConnect

AutoConnect automatically creates the required printers in a View desktop session. To do so, it requests the printer list from the ThinPrint Client on the workstation. The parameters used for this are provided by the Windows Registry of the View desktop in `ListenToWTSCreateCmd` in the path:

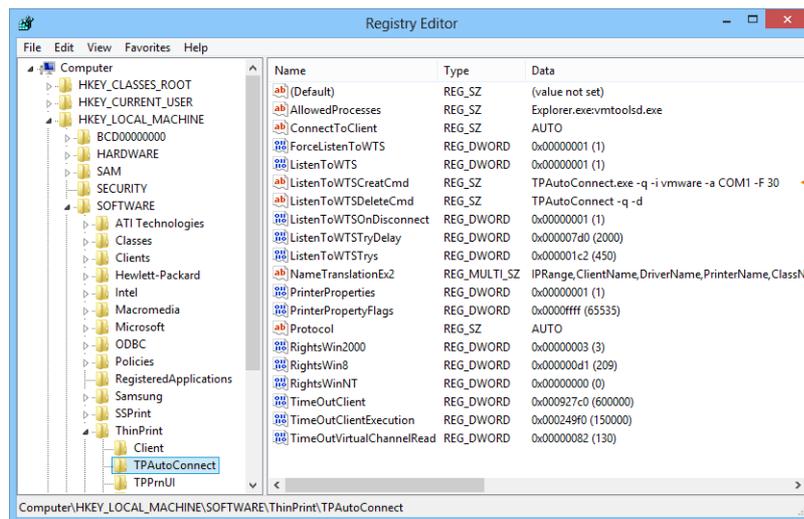
```
hkey_local_machine\software\ThinPrint\TPAutoConnect
```

Illus. 15 shows, as an example, the following entry for `ListenToWTSCreateCmd`:

```
TPAutoConnect.exe -q -i vmware -a COM1 -F 30
```

Values used:

- q (quiet; don't allow notification pop ups)
- i vmware -a COM1 (connection settings for offline mode)
- F 30 (run AutoConnect automatically every 30 seconds)

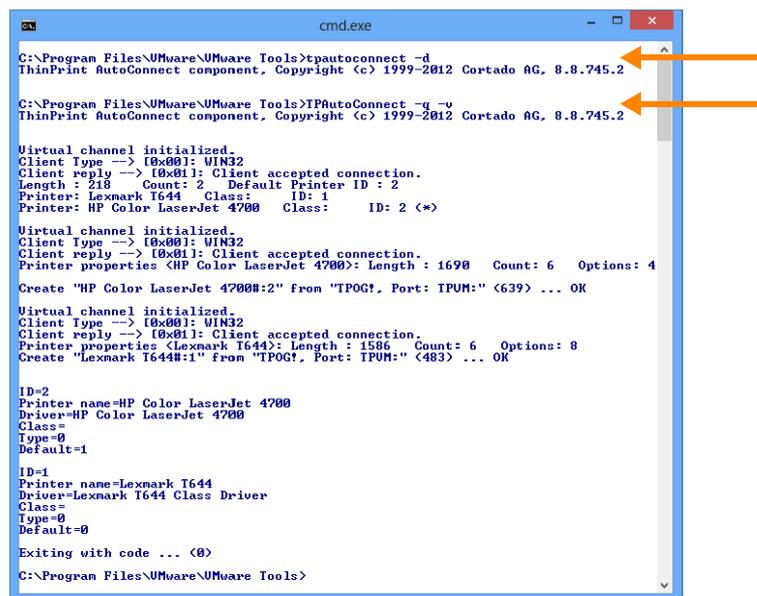


Illus. 15 AutoConnect start parameters in the Windows Registry

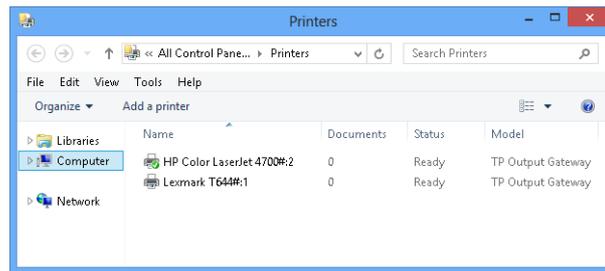
Calling from the command line To test the functionality of AutoConnect, open the command line on a View desktop (Illus. 16), and enter, in sequence:

```
cd program files\vmware\vmware tools
tpautoconnect -d
tpautoconnect -q -v
```

The result should be that with the parameter `-d` the printers will be deleted from the printers folder and will be re-created without parameters (or with `-q -v`) (Illus. 17). The parameter `-v` (verbose) displays a detailed log on the command line and `-q` (quiet) suppresses the message window (Illus. 16).



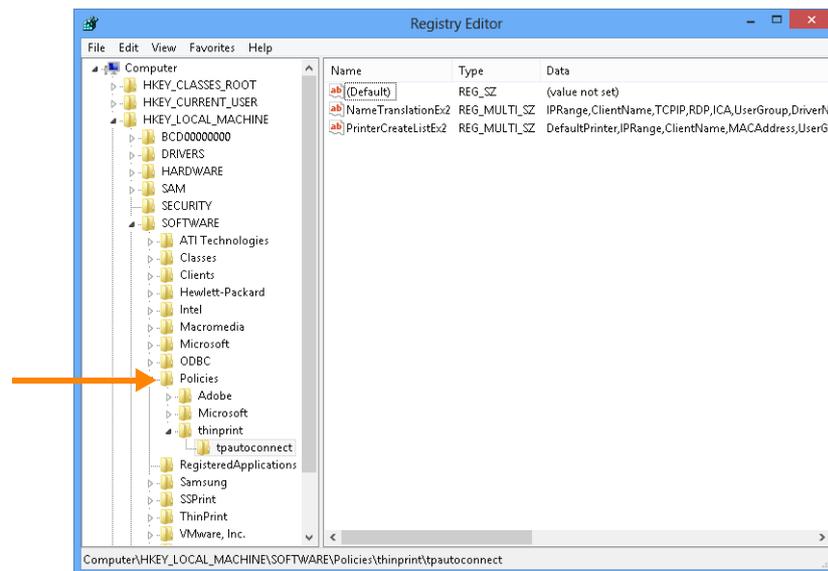
Illus. 16 starting AutoConnect from the command line



Illus. 17 printers created in a session by AutoConnect (with the virtual driver TP Output Gateway)

Group policies In the Windows Registry of View desktops, you can also check whether the AutoConnect group policies that were set up in the domain were loaded onto the desktop on logging in. After transferring the group policies onto the View desktop, you can find them in:

hkey_local_machine\software\policies\thinprint\tpautoconnect (Illus. 18)



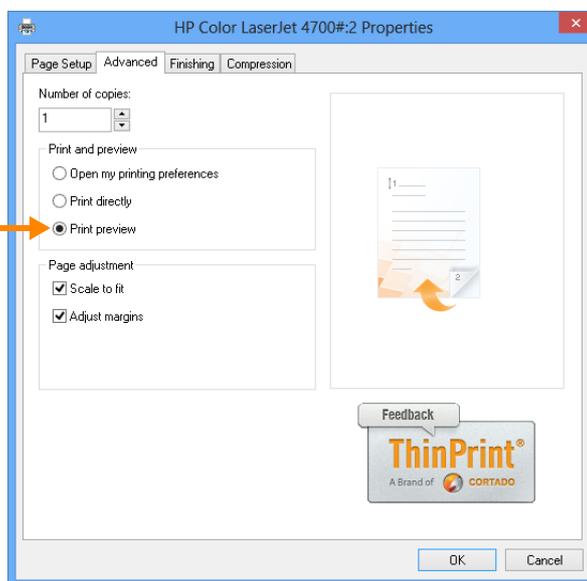
Illus. 18 AutoConnect group policies in the Windows Registry

In a View environment with Location-Based Printing you will only find the value PrinterCreateListEx2; it contains the table edited in Active Directory, Auto-Connect Map Additional Printers for VMware View (Illus. 7). With Server Engine two entries appear: PrinterCreateListEx2 (corresponds to ThinPrint AutoConnect Map Additional Printers) and NameTranslationEx2 (corresponds to ThinPrint AutoConnect Dynamic Printer Matrix); see Illus. 9.

Port monitor and Output Gateway

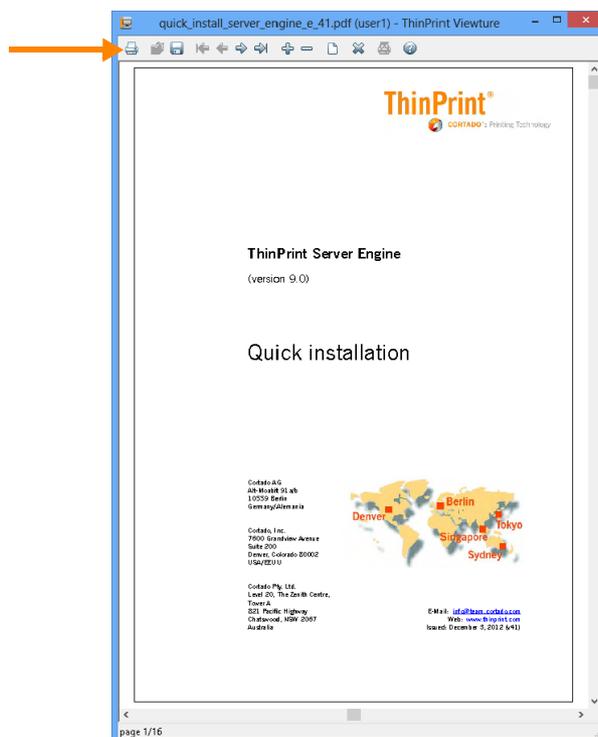
The easiest way to test the virtual printer integrated in View Agent and View Client, is to cancel a print job on the View desktop and have it open automatically in a preview on the (Windows) workstation. To do so, proceed as follows:

- Connect from a Windows PC to a View desktop (with View Client).
- Open a program on the View desktop and print to an AutoConnect created printer (e.g. *HP Color LaserJet 4700#:*2 in Illus. 19). In the printer properties of this (Output Gateway) printer, select the option PRINT PREVIEW (Arrow in Illus. 19). The print job appears in the preview on the Windows workstation (Illus. 20).



Illus. 19 select Print Preview in the View Desktop session

If the preview copy has any errors (e.g. the wrong font, or missing characters), then please refer to the White Paper *Solving Problems with Fonts* ([Page 21](#)).



Illus. 20 print preview on the workstation

Virtual Channel Gateway

Test print:

- Create an Output Gateway printer object on the central print server, and connect it to a ThinPrint port of the type USE VIRTUAL CHANNEL GATEWAY (left in Illus. 21). Share this printer object.
- Connect from a Windows PC to a View desktop (with View Client).
- Map the print object from the central print server to the View desktop, and generate a test print with preview (Illus. 19 and 20).

If the test print fails, proceed as follows:

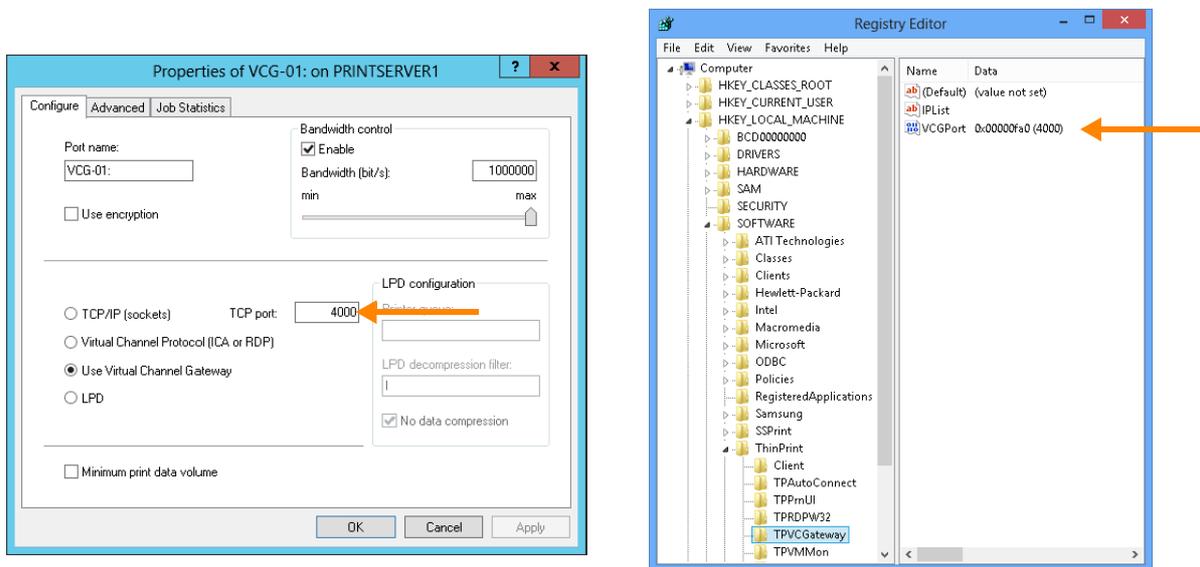
- Check whether the TCP port numbers in ThinPrint Port (on the central print server Illus. 21 left) and Virtual Channel Gateway on the View desktop match (Illus. 21 right).
- Do the firewalls of the central print server and the View desktop allow communication over the selected TCP port? (see above)
- Test whether a TCP/IP connection can be established between the central print server and the View desktop, by trying a telnet from the server to a TCP port on the View desktop. For this, the Windows service TP VC GATEWAY SERVICE must be running on the View desktop and be using the corresponding TCP port. Enter the following at the command line on the central print server:

```
telnet IP_address tcp_port
```

Example:

```
telnet 192.168.131.224 4000
```

After executing this command, a telnet window should come up – with no error message; then the connection is functional.



Illus. 21 TCP port for connecting to Virtual Channel Gateway displayed on the central print server (left) and in the View desktop registry (right)

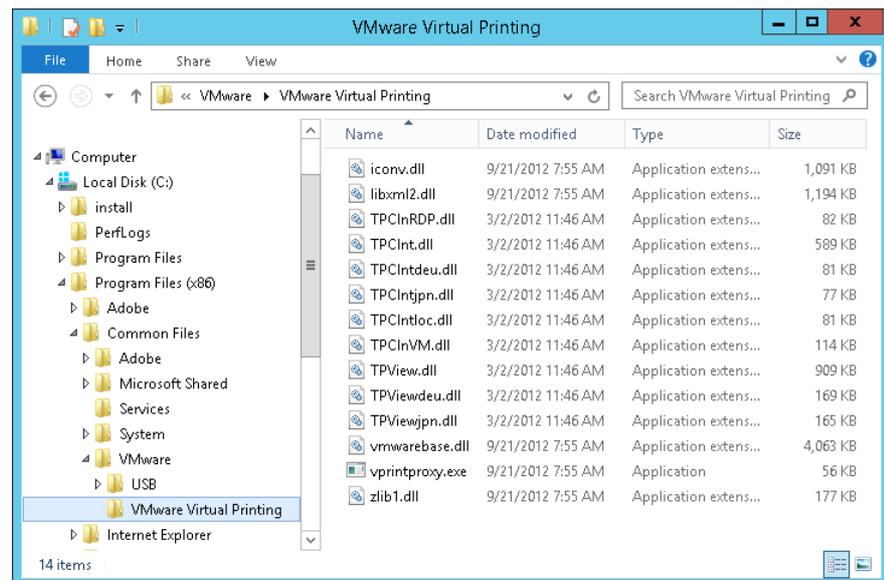
You can find more information on testing functionality and troubleshooting in the chapter *If you still can't print: checklist* in the *ThinPrint Server Engine* manual ([Page 21](#)).

ThinPrint Client (Windows)

ThinPrint Client is integrated into View Client for Windows. It is used for receiving and decompressing print jobs (in EMF or RAW format) and for forwarding them to the printer selected in the View desktop session. It supports protocols PCoIP and RDP.

Following installation of View Client on a Windows workstation, you can find ThinPrint Client in the following directory (Illus. 22):

c:\program files (x86)\common files\VMware\VMware Virtual Printing



Illus. 22 ThinPrint Client installed on a Windows workstation

You can best test the functionality of ThinPrint Client as described above, by generating a print preview (see Illus 19 and 20).

Appendix

Version info for VMware Tools and View Agent components

The following table compares versions of selected ThinPrint components (including the path to where the respective component is located on the View desktop). If you want to check which version you are actually running, simply check the version of **TPAutoConnect.exe**. It should be a **minimum 8.8.745**.

	VMware Tools 8.6.5/9.0.5	View Agent 5.1.1	View Agent 5.1.2/5.2.0
Where?	ESX 5.0u1/5.1u1	VMware View 5	VMware View 5

c:\program files\vmware\vmware tools

	VMware Tools 8.6.5/9.0.5	View Agent 5.1.1	View Agent 5.1.2/5.2.0
TPAutoConnect.exe	8.8.734	7.17.528	8.8.745
TPAutoConnSvc.exe	8.8.465	7.17.331	8.8.468
TPVCGateway.exe	8.6.239	8.6.239	8.6.239
c:\windows\system32			
TPPCOIPW32.dll		8.6.25	8.6.25/9.0.33
TPRDPW32.dll	8.8.167	8.8.152	8.2.140
TPSvc.dll	8.8.667	7.17.504	8.8.671
TPVMMon.dll	2.5.72	2.5.72	2.5.77
TPVMW32.dll	8.2.47	8.2.47	9.0.50
c:\windows\system32\spool\drivers\x64\3			
tpprn.dll	0.3.183 /8.6.183	0.3.151	0.3.183
tpprnui.dll	8.6.430	7.15.297	8.6.430
c:\windows\system32\spool\prtprocs\x64			
tpwinprn.dll	8.6.304	7.6.234	8.6.304

Further sources

Manuals and guides Under www.thinprint.de/ → PRODUCTS → OVERVIEW → <PRODUCT NAME> → MANUALS or → TECHNICAL INFORMATION you will find i.a. the following manuals:

- Server Engine
- Management Center
- Tracking
- Connected Gateway
- Personal Printing

White papers Under www.thinprint.com/ → SUPPORT → RESOURCES & DOWNLOADS → WHITE PAPERS you will find i.a. the following White Papers:

- Solving problems with fonts
- Centralize your printer drivers

Thin clients and gateways Thin clients with ThinPrint Client pre-installed as well as appliances such as ThinPrint Gateways can be found under: www.thinprint.com/ → PRODUCTS → THINPRINT

CLIENTS and under www.seh-technology.com/ → PRODUCTS → THINPRINT GATEWAYS
oder → PRINT SPOOL APPLIANCES.

VMware View website To set up Location-Based Printing use the information guide ThinPrint GPO Configuration for Location-Based Printing at www.vmware.com
(<http://www.vmware.com/files/pdf/VMware-View-ThinPrintGPOConfig-IG-EN.pdf>).

FAQs

- Are local printers (from the View Client) mapped even when Location-Based Printing is enabled?
 - Yes, even with Location-Based Printing set up an enabled you will also receive the printers from the View Client computer.
- How can I check if the Location-Based Printing group policy has been applied correctly to a virtual machine?
 - Run `gpresult /h gpreport.html` at the command line. A report will be created in the current directory and can be opened using a browser. This report shows which group policies have been applied and provides details of the changes.
 - The group policy *Location-Based Printing* creates the Windows Registry value **PrinterCreateListEx2** in: `hkey_local_machine\software\policies\ThinPrint\TPAutoConnect`
- What is the difference between mapping of local printers and Location-Based Printing?
 - With local printer mapping, firstly the printers are installed on the View Client computer and secondly mapped into the View session. With Windows clients the printer properties are transferred to the session printers. Location-Based Printing, however, enables you to create printers that are independent from the standard local printer mapping. Those printers can have their own driver, name and IP port which are defined in the Location-Based Printing group policy.
- How can mapping of local printers be disabled?
 - To disable all printer mapping, simply disable TP AutoConnect Service on the virtual machine. But, this will also disable Location-Based Printing.
 - To have the option to disable the mapping of local printers only, please upgrade to our fully-featured product ThinPrint Server Engine.
- Which printer properties can be transferred with mapping of local printers?
 - With Windows client, the following printer properties are transferred to the printers created in the View session: paper formats, paper sources (Illus. 5), color options and page orientation.

- How can I create a static printer to print to the client?
 - You can create a printer manually on the virtual machine and give it the same settings as a mapped printer (printer port: TPVM:, driver: TP Output Gateway). All print jobs of this printer will be sent to the View Client machine's default printer.
 - If you want to have the ability to select another client printer than the Windows default printer, enable the print preview option in the Output Gateway user interface on the virtual machine (Illus. 19). From the preview you can print to any printer installed on the local machine (Illus. 20).
- Which settings can I make in the Location-Based Printing configuration?
 - See <http://www.vmware.com/files/pdf/VMware-View-ThinPrintGPOConfig-IG-EN.pdf> as well as <http://pubs.vmware.com/view-50/index.jsp?topic=/com.vmware.view.administration.doc/GUID-1EB46B6D-EBF7-499E-9AE1-D8253C9FB241.html>
- What is the syntax of the IP range setting in the Location-Based Printer configuration?
 - To specify IP addresses in a specific range, use the following notation:
ip_address-ip_address
Example: 10.112.116.0-10.112.119.255
 - To specify all of the IP addresses in a specific subnet, use the following notation: ip_address/subnet_mask_bits
Example: 10.112.4.0/22
This notation specifies the usable IPv4 addresses from 10.112.4.1 to 10.112.7.254.
- Why does creating printers take longer with Location-Based Printing?
 - The time it takes to create the printers varies depending on the scope of functionality of the driver chosen for this printer. In particular, printers with Universal Printing Drivers need more time to be created than those of a specific printer model.
- What can I do if the printer is not created?
 - Execute the following steps from the command line while connected to the virtual machine (guest or View session):
 - Change to the directory %programfiles%\VMware\VMware Tools\
 - Run `TPAutoConnect.exe -d` (terminates the running AutoConnect user instance)
 - Run `TPAutoConnect.exe -v` (printer creation in verbose mode)The output should show an error message describing the issue.
 - If printer creation works when running AutoConnect manually from the command line, check if the following recommended timeout values are set or create them:
 - on a virtual desktop:
`hkey_local_machine\software\ThinPrint\TPAutoConnect
TimeOutClientExecution [dword] "150000" (decimal)`

TimeoutVirtualChannelRead [dword] "130" (decimal)

ListenToWTSTrys [dword] "450" (decimal)

ListenToWTSTryDelay [dword] "2000" (decimal)

- on a Windows client:
 - 32-bit operating systems:
 - hkey_local_machine\software\ThinPrint\Client
 - 64-bit operating systems:
 - hkey_local_machine\software\Wow6432Node\ThinPrint\Client
 - PropertyRequestTimeout [dword] "120" (decimal)
 - Restart TP AutoConnect Service in the View session or the whole virtual machine and the View Client if applicable.
- The local default printer is not set as default in the View session and the users must change it to the default every time they log in.
 - Delay the AutoConnect start for a few seconds, e.g. by changing the start type of TP AutoConnect Service from AUTOMATIC to MANUAL and then starting it using a script as follows:


```
ping 127.0.0.1 -n 10 >NUL
net start tpautoconnsvc
```

 (10 = 10 seconds start delay)
 - What if my print job is not delivered?
 - Before printing from the View desktop, activate ThinPrint preview in the (Output Gateway) preferences (Illus. 19) to check if the print job arrives at the Windows workstation. Try to print from the preview window to the target printer (Illus. 20). If this also fails, check the printer preferences or replace/update the printer driver on the workstation.
 - What can I do if my print looks different from the original?
 - Before printing from the View desktop, activate ThinPrint preview in the (Output Gateway) preferences (Illus. 19) to check if the print job already looks different there.
 - Read the white paper *Solving problems with fonts* ([Page 21](#)).
 - There is only one virtual printer displayed – where are the others?
 - See the VMware article below:
 - kb.vmware.com → WINDOWS 7 DESKTOPS WITH THINPRINT DISPLAY ONLY THE DEFAULT PRINTER (1032872)
 - Which components are involved in printer creation and printing?
 - on the virtual machine (View session):
 - ThinPrint printer mapping components
 - TPAutoConnSvc.exe
 - TPAutoConnect.exe
 - TPSvc.dll
 - Printer driver (ThinPrint Output Gateway)
 - TPPrnUI.dll
 - TPPrn.dll
 - TPWinPrn.dll

- ThinPrint port monitor
 - TPVMMon.dll
 - TPVMMonUI.dll
- Transport modules
 - TPPCoIPW32.dll
 - TPRDPW32.dll
 - TPVMW32.dll
 - vdp_rdpvcbridge.dll (from VMware)
- on the Windows workstation:
 - ThinPrint Client plugin
 - TPCInt.dll
 - TPCInRDP.dll
 - TPView.dll
 - TPCInVM.dll